

AMENDMENTS TO THE SPECIFICATION

Please amend the specification as follows

[0006] As noted, one of the reasons for presenting the abstracted view of the core network is that many complicated details of allowable routes and network availability are simplified. For example, many of today's core networks have a ring topology, such as a synchronous optical network (SONET) ring, and many of these rings networks impose timeslot continuity restrictions on allowable paths. Timeslot continuity is a requirement that traffic conveyed over successive links of the ring, must occupy the same timeslot on successive links. Where timeslot continuity is not available, traffic cannot be routed through the adjacent links in sequence, even though each link, taken alone, has sufficient capacity to carry the traffic. Such a constraint problem introduces a problem with routing constraint in computing paths through the abstracted core, because as it is possible that capacity is available over a link-route AB (between A and B) and a link-route BC (between B and C), but traffic cannot transit AB and then immediately transmit BC in sequence. Such a problem constraint is termed "subnetwork intransitivity", because transitivity (a well known mathematical property of relations asserting that for any A,B,C, if A is related to B, and B is related to C, then A is related to C) of the network fails if each of A,B and C are routes AB and BC are individually allowable but path ABC (traversing routes AB and BC in sequence) is not allowable, in the same subnetwork.

[0007] Similar subnetwork intransitivity is encountered in passive optical networks where wavelength continuity is required. In passive optical networks no optical fiber link of the passive optical network can transport traffic on two channels at the same wavelength. Accordingly a wavelength channel may be available on a first optical fiber link, and a second wavelength channel may be available on a second link, but it is not possible to transmit a signal over the two links in sequence.

[0008] A third example of subnetwork intransitivity is found in core networks that do not require wavelength or timeslot continuity, but have abstracted views that are updated in response to changes in availability of the actual resources of the network. Generally in such networks a change in availability (e.g. caused by signal failures, a threshold of occupancy is exceeded, etc.) is signaled by a tandem NE within the core network ~~with using~~ a flooding process well known in the art. This ~~is a method~~ ~~is effective~~ for delivering the change of availability information to ~~the an~~ edge networks, but it does not guarantee that the information ~~received by the edge network is either consistent or timely~~. It can take a second between receiving a first update and receiving consistent information regarding the network. In the interim an apparently allowable route may be tried unsuccessfully many times. Each unsuccessful attempt uses NE processor time, and congests network control signaling channels to no avail. This problem is referred to as "buzzing".

[0009] In the first example of subnetwork intransitivity (timeslot continuity), an allowable path may be obtained by exiting the subnetwork and returning to it. ~~For example, as the traffic may leave the ring and re-enter on a different timeslot to obtain an allowable path.~~ It is because the timeslot continuity is only required ~~between successive links within a the ring itself~~. Following the above example, in which routes AB and BC are ~~individually allowable but path ABC (that is, routes AB and BC in sequence) is not allowable, path ABDBC (traversing routes~~ ~~For example, AB, BD, DB, BC in sequence~~) would be an allowable path, ~~assuming provided that routes BD and DB had have available bandwidth, and D is not in the ring subnetwork~~. Similarly, if leaving the passive optical network core involves receiving the optical channel and reemitting the signal at another wavelength, the excursion from the core network may make the path allowable.

[0010] However, the third example (and the second example where reception of the optical channel is not an option) are examples of a stronger ~~limitation constraint~~ on acceptable routes in the network. ~~Broadly stated, the "stronger constraint" refers to a case where, for example, a path that traverses route AB cannot allowably be extended through~~

route BC, even with a detour through a node D that is not part of the subnetwork. Thus, the
"stronger constraint" would mean that neither or paths ABC or ABDBC would be
allowable, because the path traverses route AB, and so cannot be extended through route
BC, even with the intermediate detour through routes BD and DB. One method for solving
subnetwork intransitivity is taught in co-pending, co-assigned United States Patent
Application serial number 10/691,517, entitled METHOD AND APPARATUS FOR
DERIVING ALLOWABLE PATHS THROUGH A NETWORK WITH
INTRANSGITIVITY CONSTRAINTS which was filed on October 24, 2003 and is
incorporated herein by reference. The stronger constraint forbids paths such as AB, BD,
DB, BC because BC is not able to carry the wavelength regardless of its detour, or because
BC is not available, which is not indicated by the stale routing information currently held at
the edge NE. Both subnetwork intransitivity and the stronger constraint give rise to what
are termed "subset sequence constraints".